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Sports injuries display and their prevention during taekwondo classes using rehabilitation means

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Abstract: During recent years combat sports become more popular and gain social importance in society. Especially popular become the Olympic combat sports, such as taekwondo. Most specialists in taekwondo don't have sufficient experience and knowledge concerning sports injuries prevention. They appear during the training process. It is stated that most injuries appear because of insufficient readiness of taekwondists and deficiencies in classes organization and methodology of realization. **Materials.** The material of the research formed the results of studying the reasons and mechanisms of sports injuries display in contact taekwondo. **Research methods.** The following research methods are realized: scientific-methodical sources analysis and summarizing, medical cards study, survey among the athletes and specialists. The research was based on the following tests: injuries monitoring using medical cards; injuries monitoring got during the trainings and during the competitions; functional state determination using diagnostic apparatus "OMEGA-C" (Russia). **Results.** Analyzing the medical cards of the athletes, who belong to different categories and have different experience, we revealed the following injuries among taekwondists: sprains, ruptures and contusions. Less we revealed muscular-ligamentous apparatus ruptures, concussion and fracture. Most often it is possible to meet sprain because of insufficient warming-up and physical readiness of taekwondists. Not very often we revealed wounds, fissures, bone fractures and dislocations. Taking into account the characteristic of injuries display in taekwondo we created the methodology of traumatism prevention during the training classes using rehabilitation means. **Conclusion.** It was revealed that most often taekwondists had the lower extremities injuries. It is connected with the load on lower extremities. We studied theoretical material concerning injuries and hurts prevention and the reasons of their display. Rehabilitation means planning and realization after the training effects and competitions helped to increase the level of adaptation to physical loads. The index of functional state among athletes and the level of energy supply increased.

Keywords: sports injuries, taekwondo, sport, training process, rehabilitation, prevention, monitoring.

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The problem of taekwondists' working capacity recovery after competitions and injuries and their successful return to regular trainings is still urgent. Modern sport, especially combat sports, is characterized by quick increase of the training loads volume, intensity and the tension of the competitive activity increase. Psycho-emotional tension of the combats claims great demands on athletes' organisms and increases the risk of over-tension and injuries of different localization. It is

known that injuries can appear in the state of lack of rehabilitation and distinct tiredness.

E.V. Golovikhin and others (2021) consider the speed of a circular strike increase in taekwondo. It can lead to over-tension [1, p. 69-73; 2;3].

Traumatism in sport is an urgent problem. It has a great theoretical interest and practical significance for an athlete's activity. Injury is considered by the specialists as a hurt with complete or partial solidity violation, the function of the injured organ restriction. In contact kinds of combat sports traumatism depends on an athlete's readiness, the volume of the load, organism over-tension.

Physical qualities development among young athletes using different forms of classes organization is the base for a successful physical and functional training [4,6,7].

In some research works the authors show that in terms of a deep over-tension state an athlete can continue to work. It is explained by the fact that there is no inhibition and exhaustion in nerve centers. It helps to continue the work. However, in this situation local disorders can appear and an athlete can get an injury.

In dispensary observations of the specialists and doctors they mention injuries, especially during the period of educational and training camps. It is conditioned by the regularities of sports training violation. The coefficient of traumatism in combat sports, according to the results of the research works, is 3,90 (in boxing-2,92).

It was revealed that approximately 60% of all injuries appear because of lack of readiness among the athletes (in contact taekwondo) and 17% because of drawbacks in the training classes methodology and organization. It was revealed that in taekwondo there may be locomotor apparatus injuries (hip, shin, ribs contusion, sprain and rupture of ligaents, fractures), face injuries (cuts, nose bleed, hematomas, fractures) and central nervous system disorders (knockdowns, knockouts, over-tension, exhaustion). Together with these reasons of injuries can be incorrect judging, forbidden strikes and actions use, the rules of competitions violation.

In the opinion of the specialists, it is important to organize correctly formed training

classes. It leads to minimization of the received sports injuries.

It is a known fact that the training classes form the main structural unit of sports training among taekwondists. A rational planning of the classes on the basis of scientific knowledge concerning the mechanisms of tiredness development and compensation and also the dynamics of rehabilitation process in terms of the loads condition the effectiveness brings to the whole training process without injuries [5].

O.M. Mirzoev (2005) defined rehabilitation means in the system of training athletes as the condition for the struggle against tiredness and over-training state [5].

Training athletes in kinds of sport on the basis of a complex estimation of a functional state is the base for traumatism and over-training state prevention [8].

The aim of the research is to define theoretically and practically the reasons of traumatism among taekwondists and prevent them using rehabilitation means.

In order to achieve the set aim we defined the following objectives:

1. To analyze scientific-methodical sources concerning the problem of traumatism prevention in taekwondo.
2. To reveal the character and localization of injuries in taekwondo.
3. To create the methodology of traumatism prevention using rehabilitation means.

Materials and methods

The material of the research formed the results of sports injuries display in contact taekwondo. The base of the research activity was Municipal Budgetary Establishment sports school named after D.A. Razumovski, Ulyanovsk, Russia. During the period of the research since September, 2019 till March, 2021 we analyzed medical cards of the athletes concerning the problem of traumatism display in taekwondo in three groups of training: beginners, training group and the group of sportsmanship improvement. General amount of the analyzed cards was the following: beginners-

12; the training group- (TG)34; the group of sportsmanship improvement (SMI)- 27.

16 athletes- taekwondists took part in the pedagogical experiment in order to define the effectiveness of the traumatism prevention methodology during the training classes using rehabilitation means. The athletes were 12-14 years-old. During the research period we realized the following:

- injuries monitoring according to medical cards;
- injuries monitoring, got during the trainings and competitions;
- functional state determination at diagnostic apparatus “OMEGA-C”(Russia).

Results and Discussion

It is known that preventive measures organization and rehabilitation means realization after the trainings and competitions helps to decrease sports traumatism. Sports injuries are mainly appear among the beginners and mainly during irrational combat sports classes.

Medical cards analysis among combatants of different categories and experience in taekwondo showed that the following injuries can be revealed

in taekwondists: sprains, ruptures and contusions. Less we revealed muscular-ligamentous apparatus ruptures (LAR), concussion and fracture. It was revealed that most often it is possible to meet sprain because of insufficient warming-up and physical readiness of taekwondists. In the opinion of the specialists such injuries are conditioned by methodical principles of training violation. Difficult for coordination exercises are used without sufficient training. Joints injuries mainly happen in case of insufficient readiness of ligamentous apparatus for physical loads. In the opinion of the athletes themselves very often injuries are got because athletes ignore warming-up. Less than other injuries wounds, fissures, bone fractures and dislocations are met.

The amount of brain concussions and cerebral contusions form 1,01% of all injuries during the whole period of the research. For taekwondo it is typical to have individual cases of injuries. According to the data of the specialists, among men in case of 1000 training classes there are approximately 127,4 injuries, among women - 90,1 injuries. Injuries localization is mainly in the low extremities of the athletes, then go head and face injuries.

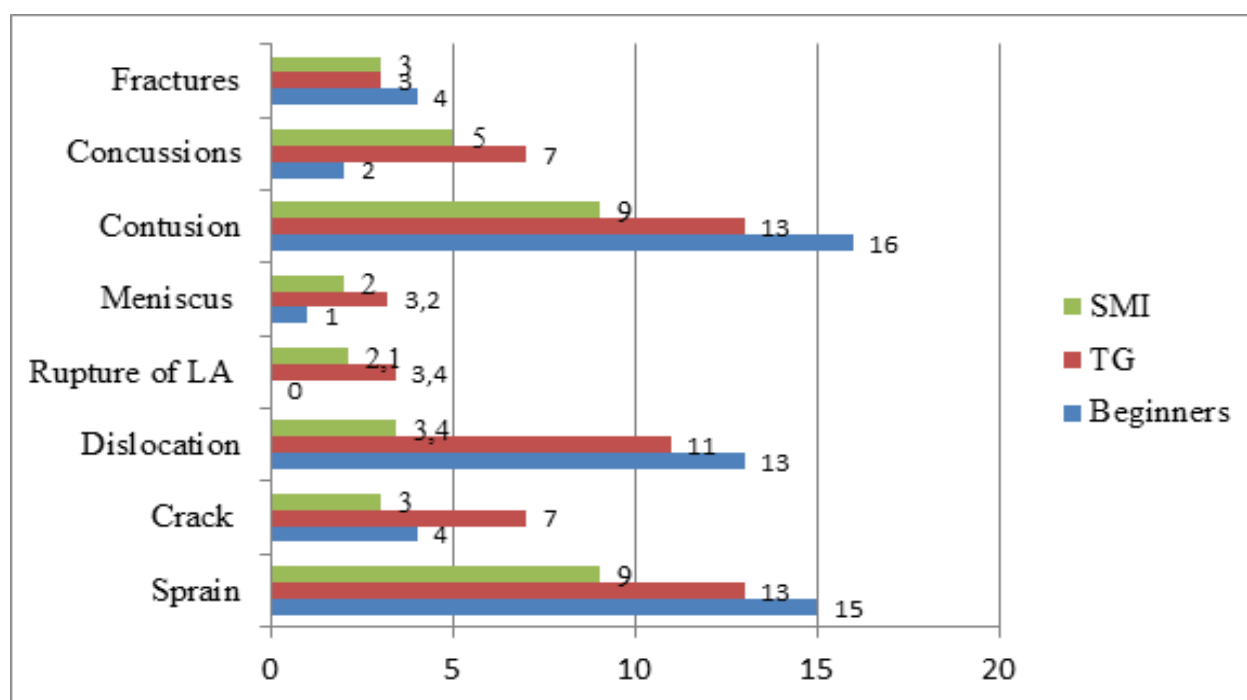


Fig. 1. Injuries among combatants in contact taekwondo according to the results of the medical cards analysis since September 2019 till December 2021.

Fig. 1 shows that the most frequently met injuries among the beginners (16%), training groups (13%) and in the group of sportsmanship improvement 9% were contusions, then go sprains and dislocations. The mechanism of injuries display in contact taekwondo is connected with frequent legs use during strikes fulfillment. Side kick is widely used by the athletes and it leads to injuries and ligamentous apparatus ruptures. In sports practice of contact taekwondo at Municipal Budgetary Establishment sports school named after D.A. Razumovski in Ulyanovsk there were several cases of bones injuries, rarely there were cerebral contusions and typical injuries of meniscus. There the percentage of display turned out to be low.

We underlined the differences in sports injuries localizations among taekwondists. It was revealed that the lower extremities injuries among the athletes took the 1st place. The load that lower extremities of taekwondists experience was significant.

In taekwondo a kick on the head (fulfilled only with the leg) takes a central place because of its effectiveness in case of points getting. This fact conditions the desire of the beginners to fulfill a knock-out.

In the opinion of the specialists great amount of injuries happens during the training classes. Among such injuries there are a lot of small injuries, such as phalange contusion. It is typical mainly for the beginners.

Studying great amount of injuries in taekwondo showed that all injuries lead to working capacity decrease and it demands indispensable rehabilitation.

Successful work concerning sports injuries prevention is impossible without knowing the reasons for their appearance. The specialists, apart from material-technical base and a coach's professionalism, consider first of all the behavior and discipline of the athletes.

Taking into account the presented above data we analyzed the reasons for injuries and the ways of their prevention during taekwondo classes.

We considered the mechanisms of injuries display among the athletes and presented their classification.

1. The results of the striking actions of an athlete and an opponent.
2. Movements, which exceed physiological limits according to the amplitude (amplitude, folding during the fall, feet twisting and others).
3. Abrupt not coordinated movements.
4. Contact with the opponent.

The results of the kicks of an athlete and his opponent are the main mechanisms of injuries display. During the training classes there can be beyond strength exercises fulfillment or quick transfer from simple to difficult combinations of actions. The main consequence of injuries can become the absence of automatism of movements. The prevention of this mechanism can become mistakes elimination in the methodology of training.

Consciousness, self-discipline level increase among athletes is the condition. It prevents injuries.

The movements, which exceed physiological limits according to the amplitude, show the lack of their training at the training classes or underestimation of warming-up – general and special. Boosting sports training with the desire to take part in competitions also lead to significant injuries. Boosting training loads can also lead to injuries among taekwondists. It is necessary to have an individual approach, especially during young athletes training.

Not coordinated movements fulfillment during the contact with the opponent, especially during the competitions, can show tiredness or over-training state of an athlete and it demands quick stop.

Taking into account the characteristics of traumatism display in taekwondo we made an attempt to create the experimental methodology of traumatism prevention during the training classes using rehabilitation means.

The methodology included theoretical material study concerning the injuries prevention, their reasons study.

Rehabilitation means planning and realization after the training effects and competitions.

In taekwondo after the training classes

it is enough to take a shower and after great and significant loads jet douche or light sauna. For the beginners it is sufficient to include hygienic water procedures. After the work with the weigh we offered the experimental group a swimming pool or sauna. It helped to increase the level of rehabilitation. At the end of the micro cycle we offered general or local massage on the upper and the lower extremities, bath every week – 5 attempts 5 minutes each during 25 minutes.

We offered each athlete a complex of rehabilitation means: water procedures (warm, cold and alternating douche); recovery cross; swimming; massage (general or local); sauna with several attempts or one-time in a day; psychomotor training. During a micro cycle it was allowed to realize the complex in a form of a cold or alternating douche with a local massage of muscles of lower extremities on Monday. On Tuesday cold and alternating douche can be continued. On Wednesday coniferous baths

can be added in the evening after the training class. On Thursday in terms of an active rest we included sauna. On Friday repeat all rehabilitation measures of the first complex, as on Monday, on Saturday and Sunday have an active rest.

The second complex additionally included rehabilitation swimming and a short-term massage or self-massage of extremities. Sauna or bath was included into all complexes of the rehabilitation measures.

Thus, the experimental methodology included successive, complex or separate rehabilitation means.

The table presents the results of the functional state monitoring among the athletes using a diagnostic apparatus “OMEGA-C”. The estimation was realized taking into account the level of adaptation to physical loads, indices of the training level, level of energy supply, psycho-emotional state and an integral index of “sports fitness”.

Table

The results of monitoring at a diagnostic apparatus “OMEGA-C”

No of monitoring	A	B	C	D	H
CG beginning	21%	31%	15%	55%	32%
CG end	23%	32%	17%	52%	34%
EG beginning	22%	29%	14%	56%	43%
EG end	72%	74%	62%	88%	75%

Notes: A – the level of adaptation to physical loads; B – index of an organism training level (functional state); C – level of energy supply; D – psycho-emotional state; H – Health – an integral index of “sports fitness”

During the incoming control all results were almost equal and it proves similar physical readiness of the control and experimental group. Program medical complex “OMEGA-C” helped to estimate functional indices of both groups on the basis of the newest technologies. The results of the functional diagnostics were also approximately similar.

The results of the final inspection show significant positive changes of the functional state and special speed endurance in the experimental group. The indices in the experimental group improved in the average by 50%-70% and it proves the effectiveness of the author’s methodology.

The results of injuries and classes attendance monitoring in the control and experimental groups after the methodology realization showed that excessive fatigue and injuries level decreased. The level of training classes non-attendance among athletes decreased by 69%. In the CG we saw the cases of acute respiratory infection, cold, non-

attendance without any reasonable excuse. They led to non-attendance level increase by 13%.

During the period of the experiment we revealed significant increase of adaptation abilities of an organism in the EG of taekwondists (50%), in the CG only by 2%. The index of the organism functional state changed in the EG by 45%, in the CG – 1%.

The index of energy supply level of muscle activity defines the effectiveness of organism energy resources mechanism increase owing to the training effects and rehabilitation means realization. In our example in the EG the increase during the period of the experiment was 48%, in the CG – only 2%. It means that rehabilitation means realization after each training class provides rehabilitation processes in the organism compensation and intensification and adaptive abilities improvement in taekwondists.

Psycho-emotional state characterizes general psychic state of an athlete owing to

motivation, interests, emotions, general state, activity and mood display. Psycho-emotional state of taekwondists from the CG and EG was on one level of display. After the experiment the athletes from the EG had a high level of psycho-emotional state owing to self-confidence and desire to risk increase. In the EG psycho-emotional state indices increase was 32% during the period of the experiment in the CG- 2%. Thus, we can state that physical working capacity increase and traumatism level decrease are connected with rehabilitation measures realization as an effective way to increase the effectiveness of taekwondists training.

Conclusion

Sports injuries getting during the training classes and competitions among taekwondists has its own dynamics. We revealed the dependence of traumatism on the level of readiness, experience and discipline level of the athletes. We revealed the differences in sports injuries localization among taekwondists.

It was revealed that most often taekwondists had the lower extremities injuries. It is connected with the load on lower extremities. We studied theoretical material concerning injuries and hurts prevention and the reasons of their display. Rehabilitation means planning and realization after the training effects and competitions helped to increase the level of adaptation to physical loads. The index of functional state among athletes and the level of energy supply increased.

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